

Claims

- [c1] An extendable conveyor, comprising:
- a support structure;
 - an extendable section defined by at least one boom, said extendable section being incrementally extendable with respect to said support structure between a fully retracted position and a fully extended position;
 - a conveyor belt reeved among said support structure and said at least one boom of said extendable section thereby defining a conveying surface;
 - a drive operable to reversibly drive said conveyor belt in opposite directions;
 - an electromechanical actuator that is operative to impede movement of said belt with respect to said extendable section; and
 - a control, said control at least partially extending said extendable section by controlling said drive to operate said conveyor belt in one direction while controlling said electromechanical actuator to impede movement of the conveyor belt with respect to the extendable section, said control at least partially retracting said extendable section by controlling said drive to operate said conveyor belt in an opposite direction while controlling said elec-

tromechanical actuator to impede movement of said conveyor belt with respect to said extendable section; wherein said conveyor belt conveying articles by said control controlling said drive to operate said conveyor belt in one of said directions while controlling said electromechanical actuator to not substantially impede movement of said conveyor belt with respect to said extendable section.

- [c2] The extendable conveyor of claim 1 wherein said extendable section is supported in a cantilever fashion by said support structure.
- [c3] The extendable conveyor of claim 1 including an operator panel at an outer end portion of said extendable section, said panel including an operator input device to selectively cause said control to at least partially extend said extendable section or to at least partially retract said extendable section.
- [c4] The extendable conveyor of claim 3 wherein said electromechanical actuator is incorporated within an end pulley at an outermost one of said at least one boom.
- [c5] The extendable conveyor of claim 4 including an electrical cable, said electrical cable extending from said control to said operator panel and said electromechanical

actuator.

- [c6] The extendable conveyor of claim 5 including a cable take-up assembly at said support for taking-up slack in said electrical cable.
- [c7] The extendable conveyor of claim 6 wherein said cable take-up assembly comprises at least one stationary sheave, at least one moveable sheave and a biasing device, said biasing device biasing said sheaves apart, wherein said cable is reeved around said sheaves.
- [c8] The extendable conveyor of claim 7 wherein said at least one stationary sheave comprises a plurality of stationary sheaves and wherein said at least one moveable sheave comprises a plurality of moveable sheaves.
- [c9] The extendable conveyor of claim 1 wherein said at least one boom comprises a plurality of booms.
- [c10] The extendable conveyor of claim 9 wherein said extendable section is supported in a cantilever fashion and said plurality of booms nest within each other when fully retracted.
- [c11] The extendable conveyor of claim 10 wherein at least one of said booms is made substantially from a unitary sheet of metal substantially forming a horizontal belt

supporting surface and support sides extending from said belt supporting surface.

[c12] The extendable conveyor of claim 1 wherein said extendable section being bowed when in an extended position wherein a central portion of said conveying surface is above an imaginary straight line extending between opposite end portions of said conveying surface.

[c13] The extendable conveyor of claim 1 including at least one friction device providing friction at said extendable section to resist retraction or extension of said extendable section when said control is not actuating said electromechanical actuator.

[c14] An extendable conveyor, comprising:
a support structure;
an extendable section defined by at least one boom, said extendable section being incrementally extendable with respect to said support structure between a fully retracted position and a fully extended position;
a drive at said support structure;
a braking pulley at an outermost one of said at least one boom, said braking pulley comprising a cylinder and a cylinder brake, said cylinder brake applying a braking force to said cylinder when actuated;
a conveyor belt reeved among said drive and said brak-

ing pulley thereby defining a conveying surface;
a control, said control at least partially extending said extendable section by controlling said drive to operate said conveyor belt in one direction while actuating said braking pulley, said control at least partially retracting said extendable section by controlling said drive to operate said conveyor belt in an opposite direction while actuating said braking pulley;
wherein said conveyor belt conveying articles by said control controlling said drive to operate said conveyor belt in one of said directions while deactuating said braking pulley.

[c15] The extendable conveyor of claim 14 wherein said braking pulley comprises an idler pulley.

[c16] The extendable conveyor of claim 14 wherein said braking pulley comprises a motorized pulley.

[c17] The extendable conveyor of claim 16 wherein said motorized roller comprises a cylinder, a drive motor within said cylinder a speed reducer between an output of said motor and said cylinder, and a cylinder brake.

[c18] The extendable conveyor of claim 14 wherein said at least one boom comprises a plurality of booms.

[c19] The extendable conveyor of claim 18 wherein said ex-

tendable section is supported in a cantilever fashion and said plurality of booms nest within each other when fully retracted.

- [c20] The extendable conveyor of claim 19 wherein at least one of said booms is made substantially from a unitary sheet of metal substantially forming a horizontal belt supporting surface and support sides extending from said belt supporting surface.
- [c21] The extendable conveyor of claim 14 wherein said extendable section being bowed when in an extended position wherein a central portion of said conveying surface is above an imaginary straight line extending between opposite end portions of said conveying surface.
- [c22] The extendable conveyor of claim 14 including at least one friction device providing friction at said extendable section to resist retraction or extension of said extendable section when said control is not actuating said cylinder brake.
- [c23] The extendable conveyor of claim 14 including an operator panel at an outer end portion of said extendable section, said panel including an operator input device to selectively cause said control to at least partially extend said extendable section or to at least partially retract

said extendable section.

[c24] The extendable conveyor of claim 23 including an electrical cable, said electrical cable extending from said control to said operator panel and said braking pulley.

[c25] The extendable conveyor of claim 24 including a cable take-up assembly at said support for taking up slack in said electrical cable.

[c26] The extendable conveyor of claim 25 wherein said cable take-up assembly comprises at least one stationary sheave, at least one moveable sheave and a biasing device, said biasing device biasing said sheaves apart, wherein said cable is reeved around said sheaves.

[c27] The extendable conveyor of claim 26 wherein said at least one stationary sheave comprises a plurality of stationary sheaves and wherein said at least one moveable sheave comprises a plurality of moveable sheaves.

[c28] An extendable conveyor, comprising:
a support structure;
an extendable section defined by at least one boom, said extendable section being incrementally extendable with respect to said support structure between a fully retracted position and a fully extended position;
a drive at said support structure;

a motorized pulley at an outermost one of said at least one boom;
a conveyor belt reeved among said drive and said motorized pulley thereby defining a conveying surface;
said motorized pulley including a cylinder and an electrical motor, wherein said electrical motor rotates said cylinder when electrical energy is applied to said electrical motor; and
a control, said control at least partially extending or retracting said extendable section by controlling said drive to operate said conveyor belt at a particular speed and controlling said electrical motor to operate at a speed less than said particular speed;
said conveyor belt conveys articles by said control controlling said drive and said electrical motor at a generally common speed to operate said conveyor belt.

[c29] The extendable conveyor of claim 28 wherein said motorized pulley further includes a brake and wherein said control at least partially extends or tracks said extendable section by operating said output of said electrical motor at zero speed and by actuating said brake to apply a braking force to said cylinder.

[c30] The extendable conveyor of claim 29 wherein said motorized pulley includes a speed reducer between an output of said electrical motor and said cylinder, wherein

said electric motor rotates said cylinder through said speed reducer.

[c31] The extendable conveyor of claim 28 wherein said motorized pulley includes a speed reducer between an output of said electrical motor and said cylinder, wherein said electric motor rotates said cylinder through said speed reducer.

[c32] The extendable conveyor of claim 28 wherein said at least one boom comprises a plurality of booms, wherein said extendable section is supported in a cantilever fashion and said plurality of booms nest within each other when fully retracted and wherein at least one of said booms is made substantially from a unitary sheet of metal substantially forming a horizontal belt supporting surface and support sides extending from said belt supporting surface.

[c33] The extendable conveyor of claim 28 wherein said extendable section being bowed when in an extended position wherein a central portion of said conveying surface is above an imaginary straight line extending between opposite end portions of said conveying surface.

[c34] The extendable conveyor of claim 28 including at least one friction device providing friction at said extendable

section to resist retraction or extension of said extendable section when said control is not extending or retracting said extendable section.

[c35] The extendable conveyor of claim 28 including an operator panel at an outer end portion of said extendable section, said panel including an operator input device to selectively cause said control to at least partially extend said extendable section or to at least partially retract said extendable section.

[c36] The extendable conveyor of claim 35 including an electrical cable, said electrical cable extending from said control to said operator panel and said motorized pulley.

[c37] The extendable conveyor of claim 36 including a cable take-up assembly at said support for taking-up slack in said electrical cable.

[c38] The extendable conveyor of claim 37 wherein said cable take-up assembly comprises at least one stationary sheave, at least one moveable sheave and a biasing device, said biasing device biasing said sheaves apart, wherein said cable is reeved around said sheaves.

[c39] The extendable conveyor of claim 38 wherein said at least one stationary sheave comprises a plurality of stationary sheaves and wherein said at least one moveable

sheave comprises a plurality of moveable sheaves.

[c40] An extendable conveyor, comprising:
a support structure;
an extendable section made up of a plurality of booms,
said booms being extendable between a fully retracted
position and a fully extended position, said extendable
section supported in a cantilever fashion by said support
structure;
a conveyor belt reeved among said booms thereby defin-
ing a conveying surface;
a drive operable to drive said conveyor belt in at least
one direction; and
wherein at least one of said booms is made substantially
from a unitary sheet of metal substantially forming a
horizontal belt supporting surface and support sides ex-
tending from said belt supporting surface, said belt sup-
porting surface supporting a portion of said conveyor
belt at said conveying surface.

[c41] The extendable conveyor of claim 40 wherein said sup-
port sides are formed to define generally horizontal track
surfaces for supporting another one of said sections.

[c42] The extendable conveyor of claim 40 wherein said at
least one of said sections includes a guard extending
generally between portions of said support sides oppo-

site said belt supporting surface.

[c43] The extendable conveyor of claim 40 wherein said extendable section is being bowed when in a fully extended position wherein a central portion of said conveying surface is above an imaginary straight line extending between opposite end portions of said conveying surface.

[c44] The extendable conveyor of claim 40 wherein each of said booms are made substantially from a unitary sheet of metal substantially forming a horizontal belt supporting surface and support sides extending from said belt supporting surface.

[c45] An extendable conveyor, comprising:
a support structure;
an extendable section made up of a plurality of booms, said boom being extendable between a fully retracted position and a fully extended position, said extendable section supported in a cantilever fashion by said support structure;
a conveyor belt reeved among said booms thereby defining a conveying surface;
a drive operable to drive said conveyor belt in at least one direction; and
wherein said extendable section being bowed when in an extended position wherein a central portion of said con-

veying surface is above an imaginary straight line extending between opposite end portions of said conveying surface.

[c46] The extendable conveyor of claim 45 wherein said support structure is mounted at a same general elevation as a support surface for a trailer into which said extendable section extends.

[c47] The extendable conveyor of claim 46 wherein said conveying surface is inclined at said support structure and an end portion of said extendable section opposite said support structure is at an operator waist-high elevation.

[c48] The extendable conveyor of claim 45 wherein said conveying surface is inclined at said support structure and an end portion of said extendable section opposite said support structure is at an operator waist-high elevation.

[c49] The extendable conveyor of claim 45 wherein certain ones of said booms are supported by other booms, wherein said booms are supported such that upstream portions of said booms are at a higher elevation relative to said imaginary straight lines than are downstream portions of the respective ones of said booms.